MOLLUSCS HAVE MANY USES

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Molluscs, rich and varied in species especially those inhabiting the coastal waters, backwaters and estuaries are of importance in contributing a good deal to the economic well-being of our country. Chiefly they are fished to provide a source of cheap but nutritious food, for pearls priced as high as gems and for shells put to varied uses. Some of the species are capable of lending themselves to farming on scientific lines to ensure steady supplies of good quality clean shellfish for the table.

Shell-fish for food being looked down with disfavour, their natural resources, which are plentiful, remain neglected despite the country's food shortage. Mussels, oysters, clams and cephalopods are fished for food, here and there supporting small scale sustenance fisheries. Very important are the pearl and chank fisheries harvested on our coasts, from ancient times, yielding high revenues to the government and providing occupation to several thousand people engaged in fishing operations and associated trade industries. There is besides an extensive source of mother-of-pearl shells, viz., *Trochus* and *Turbo* in the distant Andaman and Nicobar Islands and these like the pearl and chank fisheries are under direct governmental control and supervision. Molluscan shells are a source of lime and large quantities of them are regularly collected for this purpose. The main economic varieties of the phylum Mollusca come under the three major taxonomic groups viz., mussels oysters, clams, pearl oysters and window-pane oysters under the class Bivalvia or Lamellibranchiate, snails, top shells and turban shells under the class gastropoda and the squids, Cuttle fish and octopi under the class cephalopoda. The following account deals with the location of the molluscan resources so far known and the extent to which the said resources are used at present, indicating briefly the future scope for their better utilization.

Sea-mussels

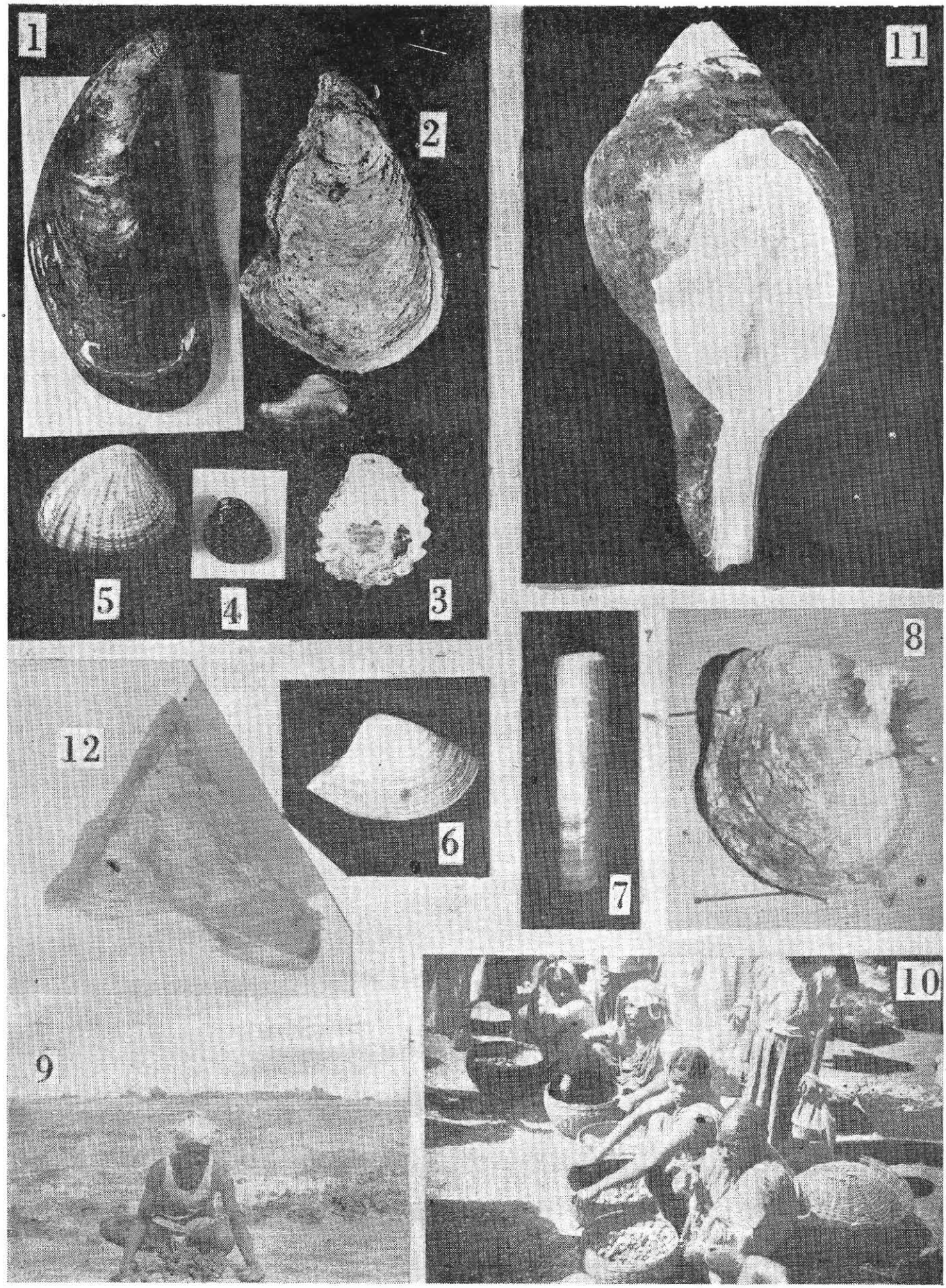
Mytilus viridis, the green mussel and *Mytilus* sp., the brown mussel of the family Mytilidae are fast growing bivalves attaining a length of 13 cm or more, forming thick massive encrustations over submerged rocks in coastal waters, each individual mussel being anchored to the substratum by means of certain slimy byssus threads. The green mussel is distributed all along the east and west coasts, but is found in great abundance along the Kerala and the southern Mysore State, being sparse in Karwar and farther north. The species is found often extending into the backwaters and the estuaries. On the east coast it occurs in Madras harbour and in Sonapur backwaters is Orissa. The brown mussel has a much restricted distribution being limited to the extreme southern peninsular region from Quilon on the west coast up to Tirunelvely district on the east coast. Mussels are a favourite item of food with coastal population who are accustomed to taking sea foods.

Edible Oysters

The commonest member of this group (family Ostreidae) is *Crassostrea madrasensis* (Preston) known as the "Indian backwater oyster" which is widely distributed in all the estuaries and backwaters of the east coast but rather restricted to southern regions only on the west coast. It is abundant in the Vembanad Lake in Kerala, Pulicat Lake in Tamil Nadu, and in the backwaters of Ennur near Madras, Cokulapalle in Andhra and of Sonapur in Orissa. The species has high tolerance to variations in salinity and lends itself to farming. Other species of oysters utilised for food are the 'giant oyster', *C. gryphoides* (Newton and Smith), the 'rock oyster' *C. cucullata* and the 'discoyster' *C. discoidiea* (Gould). *C. gryphoides* and *C. discoidea* are fished from the creeks and other similar environments from North Kanara to Kutch on the west coast and *C. cucullata* from inter-tidal rocks all along the east and west coasts. It is well known that very efficient methods of culture are practised in all maritime countries, abroad, especially France, the United States of America, Canada and Japan where the oysters are considered a great delicacy. Oysters are nutritious as they contain vitamins A and B, minerals and appreciable amount of glycogen and protein. At present oysters are used for food to a much lesser extent than the mussels or clams.

Clams and Allied Bivalves

A large number of bivalves inhabit the gays, creeks, estuaries, backwaters and the surf-beaten sandy shores. They are collected in considerable quantites and used as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food by the coastal people. Except for a few places on the west coast these bivalves never reach the markets but support sustenance fisheries of much local importance. Some species can easily be cultivated. The bay clam *Meretrix meretrix* (Linne), the backwater clam, *M. casta* Desh, the inflated clam, *Katelysia opima* (Gmelin), the cockle clam, *Gararium tumidum* Roding—, the false clams, *Paphia malabarica* Dil, and *P. marmorata* (Reeve), the ark shell *Arca* (Anadara) *granosa* Linne the wedge clams, *Donax cuneatus* Linne and *Donax scortum* Linne, the black clam, *Villorita cyprinoides* (Gray) and the finger oysters as *Solen kempi* Preston and *S. annandeli* are among the common forms fished for food.

Gastropod and Cephalopod Molluscs Used For Food

The utilisation of gastropod molluscs in India is very much limited. Some of the common species collected occasionally for the purpose are *Trochus nilotious* Linne, *Trochus stellatus*, *Umbonium vestiarium* (Linne), *Turbo brunneus* Roding, *Telescopicum telescopicum* Linne, *Xancus pyrum* (Lamarck), *Pterocera lambis Thais* spp., *Natica* spp., and *Oliva gibbosa*. Most of these species occur in abundance on our coasts but find little favour with our people who are averse to include them in their regular diet.

The cephalopods which include the cuttle fishes, squids and the octopi are generally caught on the Indian coasts in nets operated for food fishes all through the year. In the south eastern coastal regions, in the Palk Bay and Gulf of Mannar squids, chiefly *Sepeioteuthis arctipinnis* Gould support a regional fishery. In the Palk Bay during February to June squids are caught in fair abundance in a type of seine called the 'ola valai' which has strips of palm leaves tied along the wing ropes to act as scares driving them into the bag of the net. Along the coast line of the Gulf of Mannar also, especially in summer months of February and March squids in appreciable quantities are caught with other fishes. Squids are a much relished item of food and the stocks appear to be underfished. Their fishery needs to be developed also because they take a heavy toll of the young shoaling fishes.

Pearl Oysters

Pearls of high value as gems are obtained from the pearl oysters of the genus *Pinctada*. There are several species occurring in our waters, but the most important of them is *P. fucata* (Gould) which supports the pearl fisheries of the Gulf of Mannar, the Palk Bay and the Gulf of Kutch. The 'orient pearls' or 'Lingha pearls' produced by this species are world famous for their brilliant lustre. Along the east coast in the Gulf of Mannar the oysters are found on ridges of rock or coral known as the 'pears' or 'pearl banks' which occur from Cape Comorin to Kilakari with the most productive central zone near Tuticorin. They are in depths of ten to twelve fathoms, at a distance of about twelve miles from the shore. These banks in productive years have yielded millions of oysters worth several lakhs of rupees. In the Palk Bay they are found attached to submerged objects in the muddy sand bottom and do not form large beds. Only once i.e., about the beginning of the second decade of this century a pearl fishery was held off Tondi. In the Gulf of Kutch on the west coast the pearl oysters are found attached to reefs north of Halar district in Saurashtra and those near Jamnagar. The reefs can be reached and the oysters handpicked by fishers at low water spring tides. The revenue realised annually from the Gulf of Kutch beds is only a few thousand rupees.

The pearl beds off Tuticorin are under the control and supervision of the State Government of Tamil Nadu. At the time of harvesting a temporary pearl camp is organised to enrol the divers, owners of boats, their crew and pearl merchants. Each diver is helped by the crew to descend into the waters with the help of a sinking stone to pick up oysters from the banks. A diver can ordinarily remain under water for about a minute. Each day the diving operations are carried out from morning to mid-day during the period of the fishery which lasts about two months in summer when the waters are clear and the sea is calm. A third of the oysters collected by a diver each day is given away as his wages and out of this he surrenders a part to the crew and the owner of the boat. The governmental share is auctioned. The price is found to vary from Rs 50 to 150 per thousand oysters, the catches from certain banks known for their high pearl content fetching comparatively higher prices.

The fisheries have been known to be erratic, productive years being followed by prolonged lean periods. In the past eight years no fisheries could be conducted as the banks were barren.

Some measures are taken by the Governments to ensure steady yields, such as size-regulations and closed seasons for fishing and also occasional culching of the pears for the oysters spat to settle. A few sanctuaries are set apart to allow the oysters to breed and repopulate the denuded beds nearby. Still, the predators and adverse environmental factors take a large toll of the oysters.

Pearls are also produced in molluscs other than the true pearl oysters. The 'window-pane oyster' *Placenta placenta* (Linne) produces large quantities of rather dull small-sized seed pearls used for medicine in the Far East.

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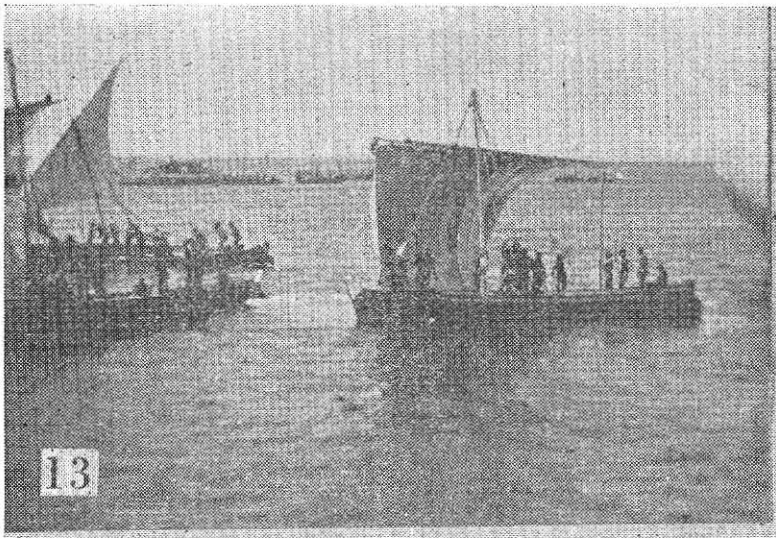
1. Green mussel, *Mytilus viridis* 2. Indian backwater oyster, *Grassostrea madrasensis* 3. Rock oyster, *Grassostrea cucullata* 4. Black clam, *Villorita cyprinoides* 5. Cockle clam, *Gafrarium tumidum* 6. The wedge clam, *Donax scortum* 7. Finger oyster, *Solen kempi* 8. The pearl oyster, *Pinctada fucata* 9. Edible oysters being collected from Gikulapalle backwaters 10. Clams sold in markets of Karwar 11. Sacred chank *Xancus pyrum* and 12. The top shell *Trochis niloticus*.



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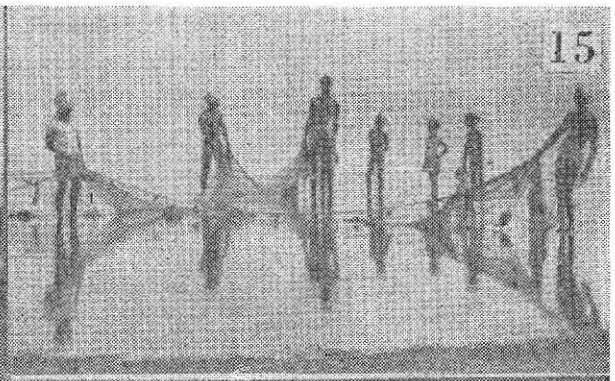

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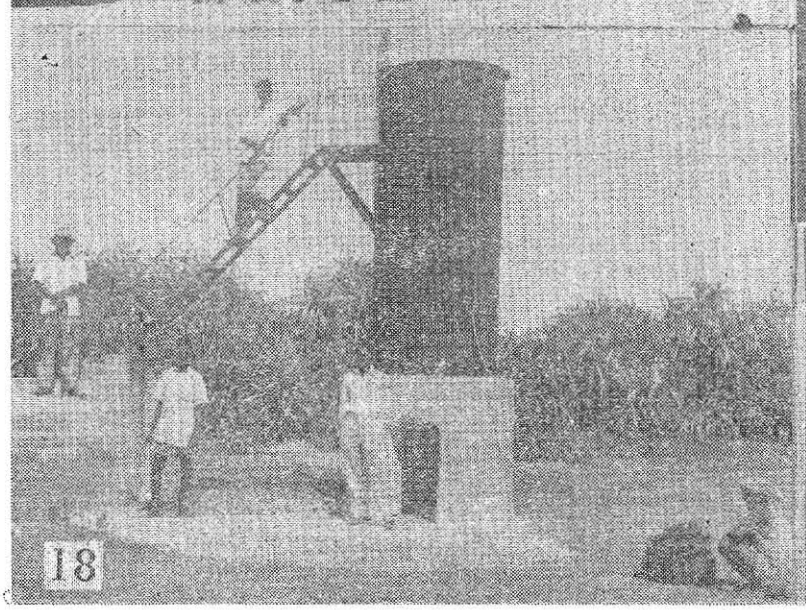

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Window-pane oysters are found in the muddy regions of the Gulf of Kutch, Bombay harbour and its vicinities and Corangi Bay in Andhra Pradesh.

Chanks

Xancus pyrum (Lmk) well known by its common name as the 'sacred chank' is restricted in its distribution to Indian coasts and the nearby coasts of Ceylon. The shell is massive and of elegant shape with thick white porcellaeous texture pliable to the saw to be cut into varied shapes. The chank is chiefly used in the manufacture of bangles. The chank fisheries like the pearl fisheries are under governmental control. The species occurs widely on our coasts including those of Andaman Islands, but fishable beds are in Tirunelveli, Ramanathapuram, Thanjavur, South Arcot, Chingleput and Nellore districts on the east coast and in Travancore and and Kathiawar on the west coast. The rare sinistral shell with the mouth opening to the left hand side of the observer known by the name 'Valampuri chank' is priced very high because of the belief that it is the harbinger of peace and plenty warding off evil. From Vedic times the chank is adored and dedicated to the temples for worship.

Miscellaneous molluscs for varied purposes. Thick shells having lustrous pearly layer or mother-of-pearl are valued high in the manufacture of buttons, brooches and the like objects. There are well organised fisheries for *Trochus niloticus* and *Turbo marmoratus* in Andamans to meet this purpose. The shells of these as also of *Cymbium*, *Dolium*, *Pterocera*, *Murex*, etc., are made into useful articles like lamp stands, lamp shades, etc. Many shells go into the making of toys, some are polished and sold as curios. Shell craft industries are highly profitable and their products very popular in countries like Philippines and Japan. With the abundance of available natural resources there is good scope for developing the shell craft industries to a much greater extent to build up an export trade with other countries, like the United States of America which at present buys the bulk of these articles from Japan.

The utilisation of molluscan shells on all coastal area is for burning them into lime of very superior quality used in every type of masonary constructions and in white-washing the buildings. Good quantities of shells are used in carbide and cement manufacture. Shells in enormous quantities are gathered from all possible places, especially around backwater regions. Abundant resources of shells are the sub-fossil deposits where the dead shells are found in thick layers several feet beneath the surface of the soil. The sub-fossil deposits are extensive in the vicinities of Pulicat Lake near Madras, Surla in Orissa and Vembanad Lake in Kerala.

Cultivable Molluscan Resources

Production from natural sources in respect of a large number of molluscan species of commercial importance can be augmented by culturing them employing methods suitable for the purpose. The basic principles underlying agricultural farming viz., collection and sowing of the "seed", care and attention of the growing crop and reaping of the harvests when ripe are generally the same in acquicultural practices also. There are along the coast line tidal flats and shallow water bays as also backwaters and estuarine regions which are ideally suited for farming shell fish. These waters are replenished periodically with nutrients brought by the rivers or drained from the land bordering them after freshets. Some of the recent observations show that the organic production is immensely high in such waters.

A good deal of biological information has been obtained in the past twenty years by the Central Marine Fisheries Research Institute on the cultivable food species like oysters, mussels and clams. Nowhere in India are the oysters cultured on scientific lines apart from a sort of oyster rearing attempted in some places as in the vicinities of Bombay where the young oysters are collected, spread on hardened grounds and allowed to grow to marketable size. In countries abroad highly technical methods are employed in oyster culture from the time when minute larvae are ready to settle as spat on specially laid culch till the fattened hygienically cleaned oysters reach the consumer. The Indian backwater oyster has the advantage of being a fast grower, comparable to the Japanese oyster *Crassostrea gigas* which is imported in Canada where it reaches the adult size in about two years as against the American oyster *C. virginica* which takes twice as much time as the former species. Further it may be noted that Japan has developed a large export trade with the United States and Canada for frozen or canned oysters ready for the table as also quantities of living oyster spats to be reared to adult stage in well looked after farms in the countries which import them. Even if there is not much demand for the oysters in this country, culture on small scale if initiated will help raising a quality product to create an export market.

The position in regard to the mussels and clams is different, they being much needed wherever they occur in this country. Yet, no attempt is made to culture them. In France, Denmark and Norway where the mussels are farmed the methods adapted are very simple, involving only collection of seed mussels and transplanting them on stakes above the bottom mud, so that they

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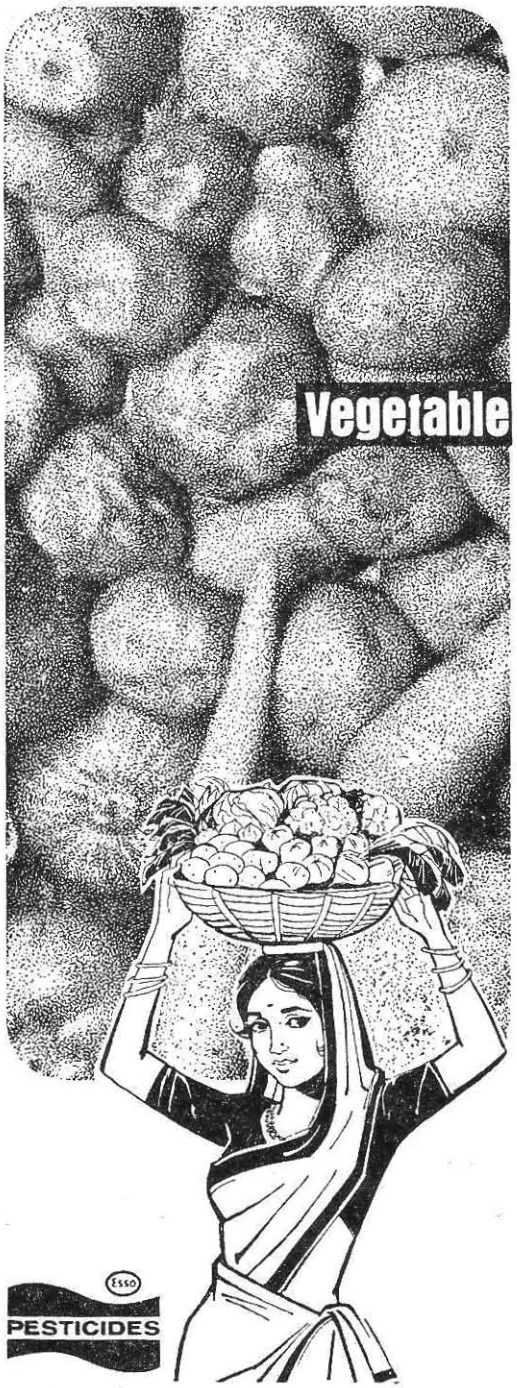
13. Pearl fishing boats with divers and crew at Tuticorin fishery 14. Washing the oyster for recovery of pearls 15. *Olava ai* operated in Palk Bay for squids 16. The Palk Bay squid, *Sepioteuthis arctpinnis* 17. Squids caught in *Olavalai*, the catch consisting almost exclusively of squids 18. Kiln at Sonapur for burning oyster shells for lime.



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